

REMARKS

This paper is responsive to non-final Office Action dated July 7, 2003. Claims 1-30 were examined. Claims 1-3, 6-11, 18, 19, and 29 stand rejected under 35 U.S.C. § 102(e). Claims 4, 5, 12-17, 21-28, 30 stand rejected under 35 U.S.C. § 103(a).

Art Rejections Under 35 U.S.C. § 102

Claims 1-3, 6-11, 18, 19, and 29 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,115,373 to Lea.

Regarding claim 1, Applicants respectfully maintain that Lea fails to teach or suggest

forwarding all packets that are successfully delivered through output ports of the buffer-less switch to the receiving nodes, through the buffer-less switch with a fixed forwarding rate

as recited by claim 1. The Office Action admits that Lea “mentions nothing about changing the forwarding rates of the incoming packets.” The Office Action further states, but fails to point out where Lea teaches or suggests, and Applicants maintain that Lea fails to teach or suggest that the system of Lea “forwards the incoming packets at the same rate that they were received.”

Assuming arguendo that Lea teaches forwarding the incoming packets at the same rate at which they were received, the Office Action fails to point out, and Applicants maintain that Lea fails to teach or suggest how forwarding the incoming packets at the same rate at which they were received teaches forwarding packets through the buffer-less switch with a fixed forwarding rate. For example, if the system of Lea receives the packets at a variable rate, then forwarding the incoming packets at the same rate at which they were received results in forwarding the incoming packets at a variable rate. Thus, Lea fails to teach or suggest forwarding all packets that are successfully delivered through output ports of the buffer-less switch to the receiving nodes, through the buffer-less switch with a fixed forwarding rate, as recited by claim 1. For at least this reason, Applicants believe claim 1 is allowable over Lea. Accordingly, Applicants respectfully request that the rejection of claim 1, and all claims dependent thereon be withdrawn.

Regarding claim 11, Lea fails to teach or suggest that

no buffer space is allocated in a receiving node
before a packet is sent, thereby simplifying switch
overhead

as recited in claim 11. The Office Action states that “Lea does not disclose anything about pre-allocating buffer space in the buffer before the packet is sent.” However, “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).” See MPEP § 2131. The Office Action fails to point out where Lea teaches or suggests, and Applicants maintain that Lea fails to teach or suggest that no buffer space is allocated in a receiving node before a packet is sent, thereby simplifying switch overhead as recited in claim 11. For at least this reason, Applicants believe claim 11 is allowable over Lea. Accordingly, Applicants respectfully request that the rejection of claim 11, and all claims dependent thereon be withdrawn.

Regarding claim 18, Applicants respectfully maintain that Lea fails to teach or suggest

a low latency switched network including a first
switch, the first switch being a buffer-less switch
coupling the plurality of sending and receiving nodes,
the buffer-less switch having a fixed forwarding delay
for all packets sent from one of the sending nodes and
successfully received by one of the receiving nodes.

as recited by claim 18. The Office Action admits that Lea “mentions nothing about changing the forwarding rates of the incoming packets.” The Office Action further states, but fails to point out where Lea teaches or suggests, and Applicants maintain that Lea fails to teach or suggest that the system of Lea “forwards the incoming packets at the same rate that they were received.” Assuming arguendo that Lea teaches forwarding the incoming packets at the same rate at which they were received, the Office Action fails to point out, and Applicants maintain that Lea fails to teach or suggest how forwarding the incoming packets at the same rate at which they were

received teaches a buffer-less switch having a fixed forwarding delay for all packets sent from one of the sending nodes and successfully received by one of the receiving nodes. For example, if the system of Lea receives the packets at a variable rate, then forwarding the incoming packets at the same rate at which they were received results in forwarding the incoming packets at a variable rate. Thus, Lea fails to teach or suggest a low latency switched network including a first switch, the first switch being a buffer-less switch coupling the plurality of sending and receiving nodes, the buffer-less switch having a fixed forwarding delay for all packets sent from one of the sending nodes and successfully received by one of the receiving nodes, as recited by claim 18. For at least this reason, Applicants believe claim 18 is allowable over Lea. Accordingly, Applicants respectfully request that the rejection of claim 18, and all claims dependent thereon be withdrawn.

Art Rejections Under 35 U.S.C. § 103

Claims 4, 5, and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lea in view of U.S. Patent No. 5,359,320 to Jaffe et al. The Office Action states that “the rejection of claims 3 and 11 also stand in this rejection.” Claims 3-5, 11, and 12 depend from claims that Applicants believe to be allowable over the art of record. Thus, claims 3-5, 11, and 12 are allowable for at least this reason. Accordingly, Applicants respectfully request that the rejections of claim 3-5, 11, and 12 be withdrawn.

Claims 13 and 21-28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lea in view of U.S. Patent No. 6,072,772 to Charney et al. The Office Action states that “the rejection of claims 1 and 18 also stand in this rejection.” Regarding claim 1, Applicants respectfully maintain that Lea, alone or in combination with Charney, fails to teach or suggest

forwarding all packets that are successfully delivered through output ports of the buffer-less switch to the receiving nodes, through the buffer-less switch with a fixed forwarding rate

as recited by claim 1. As discussed above, Lea fails to teach forwarding packets through the buffer-less switch with a fixed forwarding rate. Charney fails to compensate for this

shortcoming of Lea. Charney teaches “[a]n arbitration scheme for providing deterministic bandwidth and delay guarantees in an input-buffered crossbar switch with speedup S.” (Abstract) “[T]he delay of an individual cell in the switch is the sum of the delay of an individual cell under its input and output schedulers S_f and S_o, plus the delay due to the potential arbitration conflicts.” (Col. 8, lines 17-22) Although the delay through the switch of Charney may be determined based on the aforementioned criteria, the delay clearly varies as a function of those criteria. The delay of a packet through the input-buffered switch of Charney fails to teach or suggest a fixed forwarding rate of a buffer-less switch of claim 1. For at least this reason, Applicants believe independent claim 1 is allowable over Lea, alone or in combination with Charney. Accordingly, Applicants respectfully request that the rejection of claim 1 and dependent claim 13 be withdrawn.

Regarding claim 13, the Office Action fails to establish a *prima facie* case of obviousness.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of the ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all claim limitations.

See MPEP § 2143. The Office Action fails to point out where Lea and Charney teach or suggest, and Applicants respectfully maintain that neither Lea nor Charney, alone or in combination, teaches or suggests

the sending node polling a status register to
determine if transmission of the packet was successful

as recited by claim 13. The Office Action states that intermediary send registers of Charney “could act as the status register.” However, the Office Action fails to provide a reference supporting this statement. Assuming arguendo that intermediary send registers of Charney act as the status register, the Office Action fails to provide a reference teaching that the sending node polls this status register to determine if transmission of the packet was successful. For at least these reasons, Applicants believe claim 13 is allowable over Lea, alone or in combination with

Charney. Accordingly, Applicants respectfully request that the rejection of claim 13 be withdrawn.

Regarding claim 18, Applicants respectfully maintain that Lea, alone or in combination with Charney fails to teach or suggest

a low latency switched network including a first switch, the first switch being a buffer-less switch coupling the plurality of sending and receiving nodes, the buffer-less switch having a fixed forwarding delay for all packets sent from one of the sending nodes and successfully received by one of the receiving nodes

as recited by claim 18. As discussed above, Lea fails to teach a buffer-less switch having a fixed forwarding delay for all packets sent from one of the sending nodes and successfully received by one of the receiving nodes. Charney fails to compensate for this shortcoming of Lea. Charney teaches “[a]n arbitration scheme for providing deterministic bandwidth and delay guarantees in an input-buffered crossbar switch with speedup S .” (Abstract) “[T]he delay of an individual cell in the switch is the sum of the delay of an individual cell under its input and output schedulers S_f and S_o , plus the delay due to the potential arbitration conflicts.” (Col. 8, lines 17-22)

Although the delay through the switch of Charney may be determined based on the aforementioned criteria, the delay clearly varies as a function of those criteria. The delay of a packet through the input-buffered switch of Charney fails to teach or suggest a buffer-less switch having a fixed forwarding delay for all packets sent from one of the sending nodes and successfully received by one of the receiving nodes of claim 18. For at least this reason, Applicants believe independent claim 18 is allowable over Lea, alone or in combination with Charney. Accordingly, Applicants respectfully request that the rejection of claim 18 and dependent claims 21-28 be withdrawn.

Claims 14 and 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lea. In addition, the Office Action discusses claims 15, 16, and 17 as if they stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lea. Each of these rejections is respectfully traversed as outlined below.

Regarding claim 14, Applicants respectfully maintain that Lea, alone or in combination with other references of record, fails to teach or suggest

forwarding packets at a fixed rate on a first come first served basis from respective input ports through the switch to respective output ports

as recited by claim 14. The Office Action admits, with reference to claims 1 and 18, that Lea “mentions nothing about changing the forwarding rates of the incoming packets.” The Office Action further states, but fails to point out where Lea teaches or suggests, and Applicants maintain that Lea fails to teach or suggest that the system of Lea “forwards the incoming packets at the same rate that they were received.” Assuming arguendo that Lea teaches forwarding the incoming packets at the same rate at which they were received, the Office Action fails to point out, and Applicants maintain that Lea fails to teach or suggest how forwarding the incoming packets at the same rate at which they were received teaches a forwarding packets at a fixed rate on a first come first served basis from respective input ports through the switch to respective output ports. For example, if the system of Lea receives the packets at a variable rate, then forwarding the incoming packets at the same rate at which they were received results in forwarding the incoming packets at a variable rate. Thus, Lea fails to teach or suggest forwarding packets at a fixed rate on a first come first served basis from respective input ports through the switch to respective output ports, as recited by claim 14. For at least this reason, Applicants believe claim 14 is allowable over Lea, alone or in combination with other references of record. Accordingly, Applicants respectfully request that the rejection of independent claim 14 be withdrawn.

Claims 15-17 depend from allowable claim 14. For at least this reason, Applicants believe claims 15-17 are allowable over the references of record. Accordingly, Applicants respectfully request that the rejection of dependent claims 15-17 be withdrawn.

Claim 30 has been amended to correct typographical errors. Regarding amended claim 30, Applicants respectfully maintain that Lea, alone or in combination with other references of record, fails to teach or suggest

means for forwarding packets at a fixed rate on a first come first served basis from respective input ports through a switch to respective output ports,

as recited by amended claim 30. The Office Action admits, with reference to claims 1 and 18, that Lea “mentions nothing about changing the forwarding rates of the incoming packets.” The Office Action further states, but fails to point out where Lea teaches or suggests, and Applicants maintain that Lea fails to teach or suggest that the system of Lea “forwards the incoming packets at the same rate that they were received.” Assuming arguendo that Lea teaches forwarding the incoming packets at the same rate at which they were received, the Office Action fails to point out, and Applicants maintain that Lea fails to teach or suggest how forwarding the incoming packets at the same rate at which they were received teaches forwarding packets at a fixed rate on a first come first served basis from respective input ports through a switch to respective output ports. For example, if the system of Lea receives the packets at a variable rate, then forwarding the incoming packets at the same rate at which they were received results in forwarding the incoming packets at a variable rate. Thus, Lea fails to teach or suggest forwarding packets at a fixed rate on a first come first served basis from respective input ports through a switch to respective output ports, as recited by claim 30. For at least this reason, Applicants believe claim 30 is allowable over Lea, alone or in combination with other references of record. Accordingly, Applicants respectfully request that the rejection of independent claim 30 be withdrawn.

In summary, claims 1-30 are in the case. All claims are believed to be allowable over the art of record, and a Notice of Allowance to that effect is respectfully solicited. Nonetheless, if any issues remain that could be more efficiently handled by telephone, the Examiner is requested to call the undersigned at the number listed below.

CERTIFICATE OF MAILING OR TRANSMISSION

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Nicole Teitler Cave 10/7/03
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Respectfully submitted,

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